



# BARRICK

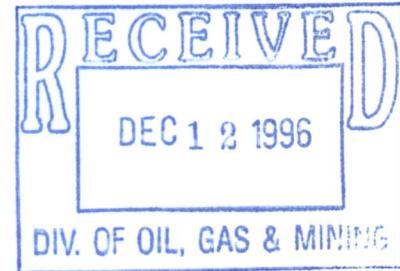
MERCUR

FILE  
m/045/017

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Barrick Mercur Gold Mine Fax: (801) 266-4296  
P.O. Box 838  
Tooele, Utah 84074-0838

December 10, 1996

Mr. Tom Munson  
Reclamation Hydrologist  
Utah Department of Natural Resources  
Division of Oil, Gas, and Mining  
1594 West North Temple, Suite 1210  
Box 145801  
Salt Lake City, UT 84114-5801



Dear Mr. Munson

Subject: Surface Hydrology and Stormwater Routing

On October 29, 1996, Brian Buck, Shawn Davis and Tim Thompson Met with Tom Munson to discuss refining the stormwater quantities that would be expected to flow down Mercur canyon after reclamation. The flow reported in the July 17, 1996 "Conceptual Plan for Regrading, Surface Hydrology and Stormwater Routing" by JBR Consultants was 2287 cubic feet per second (cfs) into the natural channel at the permit boundary. As requested, we have investigated lessening those conservative flows.

Using channel cross-sections, two "channel capacity" flows have been calculated. The total amount of water that could be contained within the main stem of the Mercur canyon channel is 2208 cfs. Based on high water marks within the channel, however, the flows are only 200 cfs. Because the Mercur Canyon drainage is an erodible channel, the 2208 cfs flow is inappropriate to use for drainage designs. We will base the channel designs on the lower 200 cfs number, as this represents the actual field conditions at the mine. The field notes have been attached for your review.

We will proceed using the SEDCAD+V3 model with lower curve numbers and a time of concentration approach to match the flow of 200 cfs observed in the field. The surface hydrology and stormwater routing document previously discussed will then be reissued to reflect these changes.

Please contact me at extension 425 should you have any questions or comments about this information.

Sincerely,

Shawn Davis  
Construction/Reclamation Engineer

Attachment

cc: C. L. Landa  
C. L. Olsen  
J. C. Goodwin  
D. P. Beatty

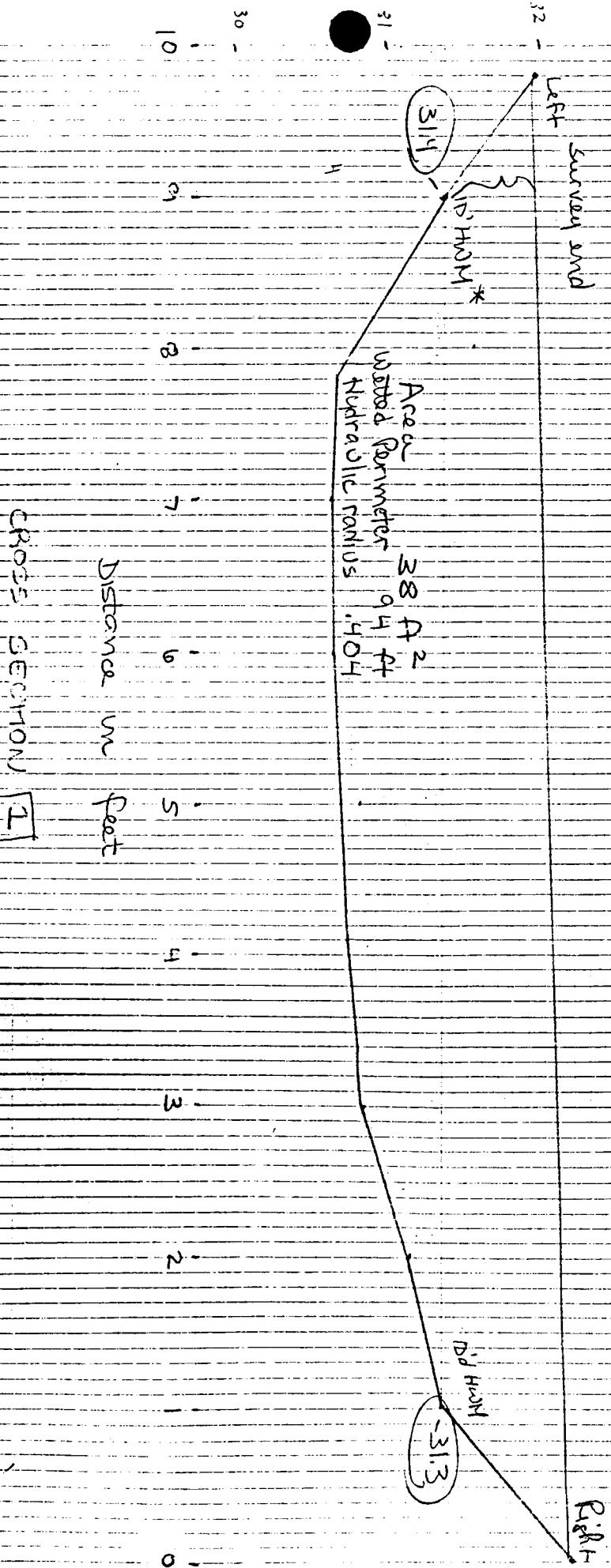
G. M. Eurick  
R. Gili (DG Consultants)  
B. W. Buck (JBR)

Mercur Indirect Discharge  
Calculations

November 25, 1996

KNSC

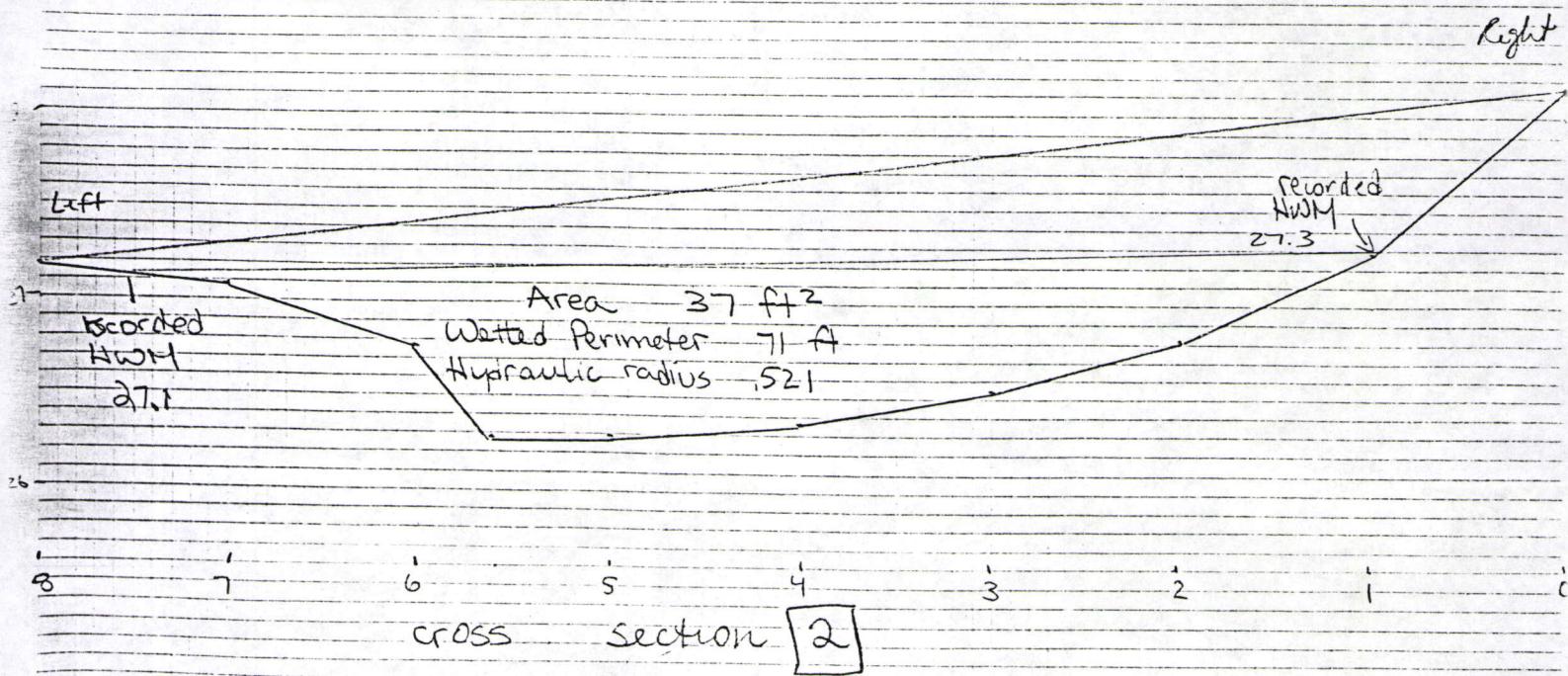
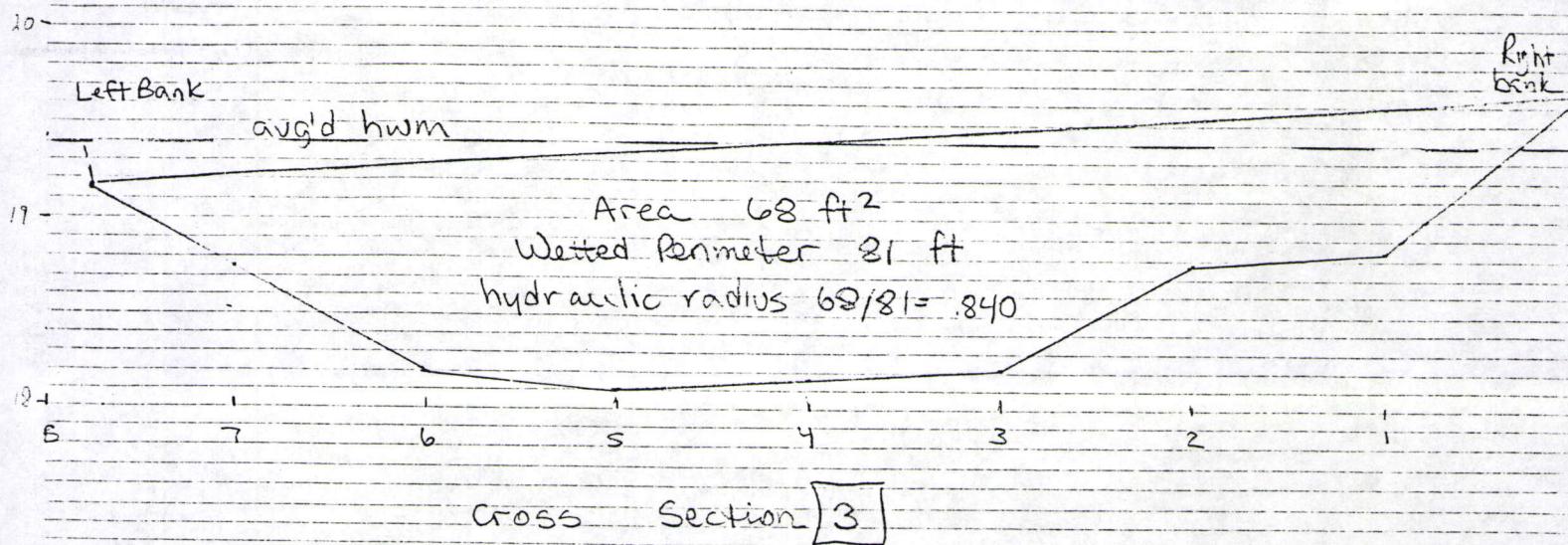
Page 1 of 4



\*H.W.W. = high water marks observed in field as indicated by vegetation, scari, deposition. Generally poor quality - not recent went  $\rightarrow$  upper bank slough  $\rightarrow$  covering H.W.W. in some areas. H.W.W. not indicative of maximum cross sectional flow capacity out of observed invert with unknown Tr.

CROSS SECTIONS

Mercur Indirect Discharge Calc.  
Nov 25, 1996 KDK Page 20  
4



Bank averaged highwater marks

Kerwer Indirect Discharge Cals  
November 25, 1996  
KDK Page 3 of 4

X-section 1 31.35

X-section 2 27.2

X-section 3 19.42

Falls

reach 1-2 4.15 m 63

reach 2-3 7.78 m 182

Conveyance

Xsec	$n$	$\frac{1.486}{n}$	A	$r$	$r^{\frac{2}{3}}$	$K = \frac{1.486}{n} A r^{\frac{2}{3}}$	$Q$
1	.045	33.022	38	.404	.547	686	1.00
2	.045	33.022	37	.521	.648	792	1.00
3	.050	29.72	68	.840	.8899	1798	1.00

 $K_w$ 

$$1-2 \quad \sqrt{686 \times 792} = 737$$

$$2-3 \quad \sqrt{792 \times 1798} = 1193$$

Assumed Q\*

$$1-2 \quad Q = 792 \sqrt{\frac{4.15}{686} (63) + \frac{792^2}{29.72^2} \left[ -1 \left( \frac{37}{38} \right)^2 (1-0) + 1(1-0) \right]}$$

$$Q = 189$$

$$2-3 \quad Q = 1798 \sqrt{\frac{7.78}{792} \left[ \frac{1798}{29.72^2} \left( \frac{68}{37} \right)^2 (1-5) + 1(1-5) \right]}$$

$$Q = 250$$

\*see attached for L...1.

Nov 25, 1996

14K Page 4 of 4

$$\frac{Q^2}{2g}$$

$\downarrow$   
hr

 $\Delta h_r$  $h_f$ 

$$S = \frac{h_f}{L}$$

$$S^{\frac{1}{2}}$$

Computed Q (kws)Assumed Q

(1-2)	189	up .3841 down .4052	- .0211	4.129	.0655	.256	189	OK
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(2-3)	250	up .6698 down .1983	.4715	8.0158	.044	.2099	250	OK
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$$Q^{**} = 1798 \sqrt{11.93 - \frac{1798}{792} \left( \frac{1798}{685} (245) \right) + \frac{1798^2}{2g 68^2} \left[ - \left( \frac{68}{38} \right)^2 (1-0) + \left( \frac{68}{37} \right)^2 (5-0) + (1-5) \right]}$$

$$= 1798 - 3.2022 + 1.6888 + .5$$

$$= 163$$

$$2.27(642.142) + 10.856[-1.0134]$$

$$1457.794 - 11.0016$$

3 sec formula

attached

given undesirable expansion between 2 + 3, and poor observed heads, + great difference between first 2 versus 3rd x-section, use final conservative discharge > 163, > 189, but hot up to 250 (expansion lost area)

say 200 cfs